UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

February 12, 2018

Mr. Josiah Nishita
Deputy County Clerk
County of Maui
200 S. High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Nishita:

Thank you for your inquiry on January 10, 2018. I hope this information will be useful to the County.

1) Has the Environmental Protection Agency ("EPA") conducted research into the effects oxybenzone or octinoxate may have on human health or the marine environment? If so, please provide any research conducted relevant to the effects of oxybenzone and/or octinoxate on marine ecosystems.

The EPA information on both oxybenzone and octinoxate is available online through our EPA Chemistry Dashboard https://comptox.epa.gov/dashboard/. These links provide information on chemical properties, environmental, toxicity values, ADME, fate/transport, exposure, bioassays, similar molecules, synonyms, literature, external links, and provide multiple references to studies on these chemicals.

Oxybenzone or benzophenone-3:
https://comptox.epa.gov/dashboard/dsstoxdb/results?utf8=%E2%9C%93&search=oxybenzone+
https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID50519359

2-Hydroxy-4-[(oxiran-2-yl)methoxy]phenyl}(phenyl)methanone in IRIS
https://cfpub.epa.gov/ncea/iris/search/index.cfm?keyword=%7B2-Hydroxy-4-%5B%28oxiran-2-yl%29methoxy%5Dphenyl%7D%28phenyl%29methanone

Octinoxate:
https://comptox.epa.gov/dashboard/dsstoxdb/results?utf8=%E2%9C%93&search=octinoxate

You may also be interested in the following related documents:

"Coral Reef and Coastal Ecosystems Decision Support Workshop," EPA/600/R-14/386, February 2015, https://nepis.epa.gov/Exe/ZyPDF.cgi/P100NDSN.PDF?Dockey=P100NDSN.PDF

"Toxicopathological Effects of the Sunscreen UV Filter, Oxybenzone (Benzophenone-3), on Coral Planulae and Cultured Primary Cells and Its Environmental Contamination in Hawaii and the U.S. Virgin Islands," Downs, C.A., Kramarsky-Winter, E., Segal, R. et al. Arch Environ Contam Toxicol

(2016) 70: 265. https://doi.org/10.1007/s00244-015-0227-7, co-authored by Paul Pennington of the U.S. National Oceanic and Atmospheric Administration, Center for Coastal Environmental Health and Biomolecular Research https://link.springer.com/article/10.1007%2Fs00244-015-0227-7

The Centers for Disease Control investigated *Concentrations of the Sunscreen Agent Benzophenone-3 in Residents of the United States: National Health and Nutrition Examination Survey 2003–2004, Antonia M. Calafat, Lee-Yang Wong, Xiaoyun Ye, John A. Reidy, and Larry L. Needham Environ Health Perspect. 2008 Jul; 116(7): 893–897. Published online 2008 Mar 21. doi: 10.1289/ehp.11269 PMCID: PMC2453157* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2453157/

2) Is the EPA aware of any other local, state or foreign governments that prohibit the sale or use of sunscreen products containing oxybenzone or octinoxate, or other sunscreen-related substances or chemicals? If so, please identify some examples.

No.

3) Is the EPA aware of any National Environmental Impact Statements ("NEIS") related to oxybenzone, octinoxate, or other chemicals or substances used in sunscreens? If so, please provide those NEIS.

No.

4) The EPA appears to have conducted investigations into "engineered nanomaterials" that are components of titanium dioxide-based sunscreens (see, https://cfpub.epa.gov/si/si public record report.cfm?direntryid=335303). Is the EPA researching the environmental effects of substances used in sunscreens in a general sense (i.e., not strictly related to oxybenzone or octinoxate)?

EPA's research on nanomaterials is summarized on the following web site. Please see the section on "What Nanomaterials is EPA studying?" https://www.epa.gov/chemical-research/research-nanomaterials

5) Does the EPA have an official position on the use of sunscreen products containing oxybenzone or octinoxate, whether they are recommended for use, not recommended for various reasons, or neutral on the matter? Would the EPA support or take a position on Maui County's proposed prohibition on the sale and use of sunscreens containing oxybenzone or octinoxate?

The EPA's statement on the use of sunscreen products can be found in our 2006 fact sheet: "Sun Screen, The Burning Facts." https://www.epa.gov/sites/production/files/documents/sunscreen.pdf

In this fact sheet, we have a statement on the active ingredients in sun screen as follows:

> "What Are the Active Ingredients in Sunscreen?
> Chemical Ingredients
> Broad-spectrum sunscreens often contain a number of chemical ingredients that absorb UVA and UVB radiation. Many sunscreens contain UVA-absorbing avobenzone or a benzophenone (such as dioxybenzone, oxybenzone, or sulisobenzone), in addition to UVB-absorbing chemical ingredients (some of which also contribute to UVA protection). In rare cases, chemical ingredients cause skin reactions, including acne, burning, blisters, dryness, itching, rash, redness, stinging, swelling, and tightening of the skin. Consult a physician if these symptoms occur.

These reactions are most commonly associated with para-aminobenzoic acid (PABA)-based sunscreens and those containing benzophenones. Some sunscreens also contain alcohol, fragrances, or preservatives, and should be avoided if you have skin allergies."

Please also see the https://www.epa.gov/sunsafety web page

6) In various materials produced, the EPA recommends the use of broadspectrum sunscreens with a sun protection factor ("SPF") of at least 15. Does the EPA consider broad-spectrum mineral based sunscreens (such as titanium dioxide or zinc oxide) as effective as broad-spectrum chemical based sunscreens in a safe sun regimen, assuming equivalent SPFs?

The EPA 2006 fact sheet, "Sun Screen, The Burning Facts," provides a table comparing the amounts of sun protection for various FDA Monograph Sunscreen Ingredients. The fact sheet states, "For the most up-to-date information on approved sunscreen ingredients, visit the FDA Web site at www.fda.gov." https://www.epa.gov/sites/production/files/documents/sunscreen.pdf

Please also see the U.S. Food and Drug Administration Sunscreen page: https://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/UnderstandingOver-the-CounterMedicines/ucm239463.htm

7) The EPA appears to run various educational or promotional programs as part of its mission, including the SunWise program. In the EPA's opinion, has the SunWise program been successful in establishing positive changes toward a safe sun regimen in children? Have these efforts been tracked to determine whether children in the SunWise program maintain these good habits throughout adulthood?

EPA Region 9 is not involved in tracking the effectiveness of the EPA Sunwise Program. Please contact the EPA Sun Safety program regarding this question:

By email: https://www.epa.gov/sunsafety/forms/contact-us-about-sun-safety

Or by mail: Stratospheric Protection Division
1200 Pennsylvania Ave., NW
Mail Code 6205T
Washington, DC 20460

8) Regarding a safe sun regimen and ocean-friendly sunscreen use, does the EPA view education or regulation as the most vital component toward positive changes, or are both equally needed?

Education and regulation are both effective tools.

9) Some manufacturers advertise their sunscreen products as "reef safe" or "reef friendly". Does the EPA recognize certain types of sunscreens as "reef safe" or "reef friendly"? If so, please provide research supporting such claims. If not, is the EPA aware of any regulatory agency who monitors and determines such claims?

We are unaware of EPA evaluations of sunscreen impacts to reef environments. Please see answers to Questions 1, 5 and 6 above.

10) Is the EPA considering any rulemaking regarding the environmental effects of chemicals/substances contained in sunscreens? If so, please provide supporting documentation.

No.

11) Regarding EPA Region 9's oversight and enforcement of the federal Clean Water Act, does the EPA consider oxybenzone or octinoxate, or any other substance typically used in sunscreens, to be a pollutant," as defined in Section 502 of the Clean Water Act? If so, is the EPA working with the State of Hawaii's Department of Health or any other agency in Region 9 on any regulatory measures related to these pollutants?

Substances found in sunscreen, such as oxybenzone and octinoxate, could be "pollutants" under certain circumstances because the Clean Water Act's definition of "pollutant" includes "chemical wastes." However, the Clean Water Act does not regulate all discharges of pollutants to navigable waters, and may not apply to the release of chemicals from a person's skin. Section 502 defines "discharge of a pollutant" as "any addition of any pollutant to navigable waters from any point source . . . or to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft." Since a "point source" is defined as "any discernible, confined and discrete conveyance . . . or vessel or other floating craft . . .," the one federal court of appeals that has addressed this issue determined that human beings are probably not point sources. United States v. Plaza Health Lab., 3 F.3d 643 (2nd Cir. 1993).

12) Is the EPA aware of any federal, state, or other municipal regulation of pollutants introduced via direct human contact? If so, please elaborate.

Various state and local restrictions prohibit human contact or swimming for water in reservoirs designated as drinking water supplies. These regulations are usually based upon the potential for bacterial or viral contamination of drinking water through human contact. We are unaware of any federal, state, or other regulations based upon the potential for contamination by sunscreen or other personal care products.

13) Is the EPA, alone or in cooperation with any other agency, considering or implementing water quality testing or monitoring protocols for sunscreen related substances?

No.

The following questions refer to the EPA's 2015 Climate Action Benefits Report relating to coral reefs, a copy of which is attached for your reference.

14) The 2015 report identifies high water temperatures and ocean acidification as the two leading causes of the disappearance of vibrant coral reefs. Is the EPA aware of any negative effects oxybenzone or octinoxate may have on coral reefs, or their ability to withstand or recover from the aforementioned environmental forces?

We do not have information to address this question beyond the information included in the 2015 Climate Action Benefits Report.

15) "For major U.S. [United States] reefs, projections under the Reference show extensive bleaching and dramatic loss of shallow coral cover occurring by 2050, and near complete loss by 2100. In Hawaii, coral cover is projected to decline from 38% (current coral cover) to approximately 5% by 2050, with further declines thereafter." In the EPA's opinion, would a prohibition on the sale or use of sunscreens containing oxybenzone or octinoxate have a positive effect in Hawaii on slowing the projected loss of shallow coral cover? If so, would a prohibition have a measurable long term effect assuming no dramatic changes in current global greenhouse gas ("GHG") mitigation efforts?

We do not have information to address this question beyond the information included in the 2015 Climate Action Benefits Report.

16) According to Figure 1, the impact of unmitigated climate change on coral reef cover in Hawaii shows almost complete disappearance of shallow coral reefs by 2100. According to Figure 2, even with global GHG mitigation efforts, Hawaii will still see shallow coral reef cover reduce by more than half by 2100. What steps could the Maui County Council take to slow down or reverse this trend?

The Maui County Council could prioritize County management efforts toward restoring and maintaining coral reef ecosystem resilience by reducing local (non-climate) stressors which hinder the ability of these ecosystems to withstand or adjust to climate change. Efforts to reduce non-climate stressors might include minimizing localized human stressors such as overfishing and destructive fishing practices, coastal development and shoreline hardening, land-based sediment and nutrient pollution, and marine-based pollution. The U.S. Coral Reef Task Force website provides resources for assessment, planning, and management related to climate change effects on coral reefs. https://coralreef.gov/climate/

The Hawaii Coral Bleaching Recovery Plan provides management strategies to support coral reef recovery which are applicable to impacts beyond coral bleaching. The top five management recommendations include: 1) Establish no-take Marine Protected Areas; 2) Reduce sediment stress on corals through improved management of land-based sources; 3) Establish herbivore fishery management areas; 4) enhance marine enforcement efforts; and 5) Reduce nutrient/chemical stress on coral reefs through improved management of land-based sources.
https://dlnr.hawaii.gov/dar/files/2017/04/Coral_Bleaching_Recovery_Plan_final.pdf

17) Economic benefit from recreational activities in Hawaii relating to our coral reefs is estimated at approximately $20 billion through 2100. "In Florida, where coral reefs have already been heavily affected, recreational benefits are also positive, but notably lower at approximately $1.4 billion." Does the EPA attribute the lower economic benefit in Florida primarily to the substantial loss in their shallow coral reef cover, or are there other factors being considered in this assessment?

We do not have information to address this question.

18) Relating to question #17 above, shoreline protection, vibrant fish-rearing habitats and other important benefits provided by coral reefs are not included in the economic value assessed of shallow coral reef cover. Since 2015, has the EPA assessed the economic value of these or other benefits provided by coral reefs? If so, please elaborate.

We do not have information to address this question.

19) Relating to question #17 above, does the EPA have a breakdown of the economic benefit provided to Hawaii by its shallow coral reef cover by County or island? If so, please provide. The following question is related to the Office of Air and Radiation's "Facts About Skin Cancer: Hawaii", a copy of which is attached for your reference.

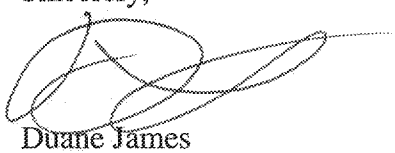
No.

20) "In Maui County, the rate [of new melanoma diagnoses] is nearly double the national average" and higher than the averages of all other Counties in Hawaii. Death rates associated with melanoma are also higher in Maui County than all other Counties in Hawaii. What does the EPA attribute these higher rates in Maui County to, even when compared to places like Florida or Puerto Rico, or other Counties in Hawaii? In the EPA's opinion, how would a prohibition on the sale and use of sunscreen products containing oxybenzone or octinoxate impact these rates?

We do not have information to address this question.

If you have any further questions, please feel free to contact our Regional Science Liaison, Matt Small, at small.matthew@epa.gov or (415) 972-3366.

Sincerely,



Duane James
Manager, Science Service Branch

cc: Alec Wong, Hawaii Department of Health